Product description

VTD – Active supply air diffuser

Introduction

VTD is an active supply air diffuser for wall mounting. The family of active supply air diffusers has been developed to be able to control indoor climate with under-temperature supply air without having draught problems on reduced air flow. The diffuser is equipped with sensors and control electronics that optimise the air flow regarding the actual cooling requirements in the room. In combination with extract air balancing, a system with VTD reduces energy consumption and contributes actively to a good indoor climate.

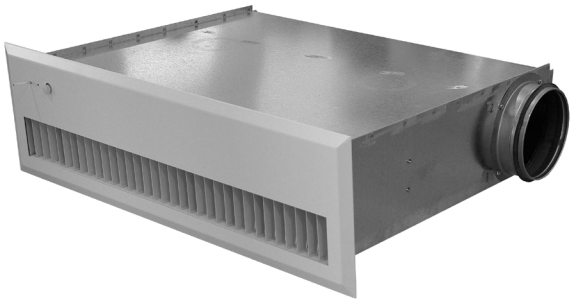
The diffuser is equipped with:

- flow sensor
- occupancy detector
- temperature sensor
- IR link for communication with computer
- network communication

Simplicity

VTD has been developed with simplicity in focus. Simplicity in design, installation and operation. This provides benefits including:

- minimised construction measurements
- built-in sensor
- built-in control electronics
- factory calibrated
- adjustment and troubleshooting etc. can be done with a computer via IR

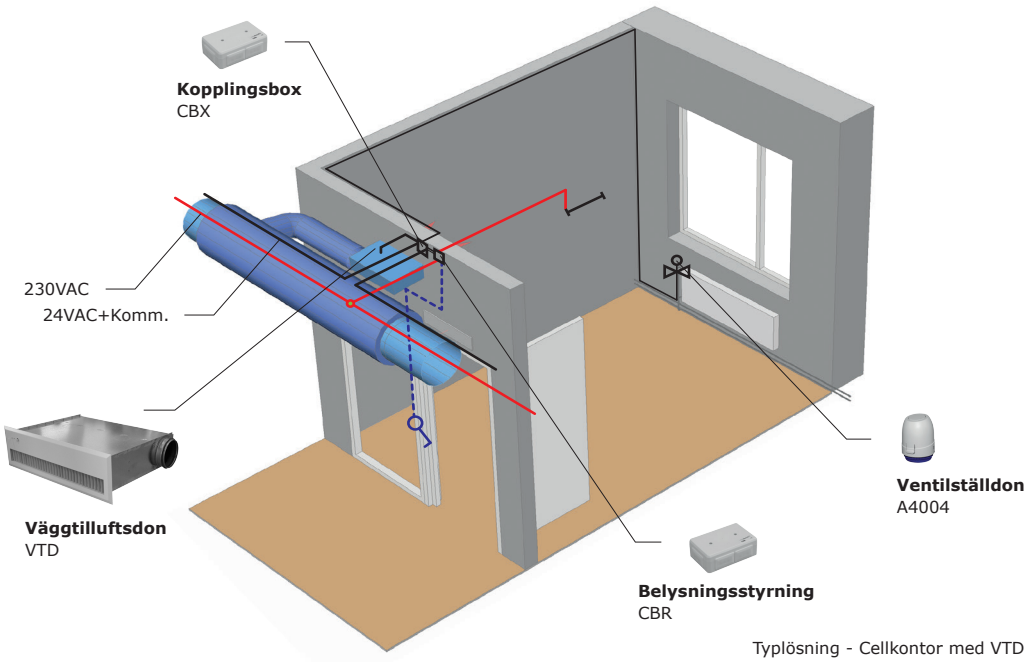


VTD - Active supply air diffuser. VTD is a complete unit including front panel and plenum box with integrated controller electronics and diffuser package.

Potential energy savings

VTD comes with tools for an optimised VAV function. Experience shows that relative to a CAV solution, the following savings can be achieved:

- > 90% supply air heating
- 50% fan electricity
- 25% cooling
- 15% radiator heating
- 50% lighting electricity



Typlösning - Cellkontor med VTD

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During renovation
VTD is highly suitable for use on renovation or refurbishment of hotels and offices where the ceiling height may be limited.

Renovation properties are often characterised by existing ducts (max. 160 mm) and with constant flows. By insulating the main duct for supply air, providing under-temperature supply air, replacing the existing supply air diffusers with VTDs and installing a flow balance controller at corridor level, you obtain extremely cost-effective climatisation of the premises. The only electrical installation which must be done is a supply/communication loop to the CBX diffuser connection box.

Function

VTD is a supply air diffuser with variable damper height for constant air supply speed. The damper height is controlled by a motor which opens or closes a plate pack that manages high air outflow speed with low noise level. It gives a strong injection of room air and thereby obtains a good mixing effect, with low temperature gradients in normal rooms and the avoidance of cold draughts. Thanks to this strong injection of air, the mixing of room air means that the air stream has reached room temperature after only 1.5 meters.

Flow sensor
In order to limit the minimum and maximum flow and to allow the flow to be pressure independent, the VTD is equipped with a flow sensor. After calibration, the sensor also provides the current pressure in the diffuser box.

Occupancy detector
To obtain a quicker reaction on activation of the diffuser (occupancy flow) and to limit energy consumption, this sensor is used with time setting options. The detector is also used for lighting control.

Temperature sensor
A temperature sensor is placed on the front of the diffuser, where it measures the room's true temperature, i.e. the air following mixing in the room.

IR link
For communication with PC via IR adaptor.

Network communication
A VTD diffuser is connected with a node ID to a communications network. The parent system can then be used to add the flows or control the diffuser etc.

Communication

The following user interface for reading off and setting the active supply air diffuser's actual values and setpoints etc. are available:

- computer via communication with U2IR
- Mini-DUC CMA via communication loop using CAN protocol (LCCP)
- LINDINSPECT webserver or parent system via mini-DUC CMA and Modbus RTU

The VTD can communicate via the following protocols:

- CAN (LCCP)
- Modbus RTU (via mini-DUC CMA)

Calibration

The VTD is factory pre-calibrated with high accuracy. Network settings, balancing zones etc. are adjusted in situ in the facility.

Alarms

The VTD has a number of built-in alarms and can give alarms via network communication.

Example of instrument panel in LINDINSPECT.

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Technical specifications

General

Dimensions (mm)
The front panel's dimensions are shown in Figure 1 below. The diffuser box dimensions are shown in Figure 2.

Connection of sleeve coupling to duct.
There are three different possibilities for connection of the sleeve coupling to the duct. The position of the connection possibilities is shown in Figure 2. The plate is knocked out and the sleeve coupling is screwed in.
Duct size: Ø125

Material
Front panel: epoxy coated steel plate.
Diffuser box: galvanised steel plate.

Colour
Front panel: RAL 9010 in standard version.
Choice of colour can be specially ordered.

Electrical system

Power supply
24 VAC.

Output
2 VA when resting.
5 VA at moment of regulation (approx. 100 hours/year).

CE marking
Fulfils EMC and low voltage directives.

Regulation

Interval
Pressure range: 30–170 Pa.
Flow range: 3–50 l/s.
Noise level for 2 different control positions with VTD:
35 dB(A) achieved at 170 Pa, 50 l/s
30 dB(A) achieved at 100 Pa, 45 l/s

Speed
Maximum change (between open and closed diffuser) controlled within approx. 3 min.

Accuracy
± (4% + 1l/s)

Noise generation

See page 4.

Input and output signals

The signals listed below are transmitted via the CBX connection box.

Input signals
1 x 1-6 VDC for GFI flow sensor.
2 x 0-10 VDC.

Output signals
2 x 0-10 VDC.
1 for CBR lighting control box.
1 x 24 VAC TRIAC (valve actuator).

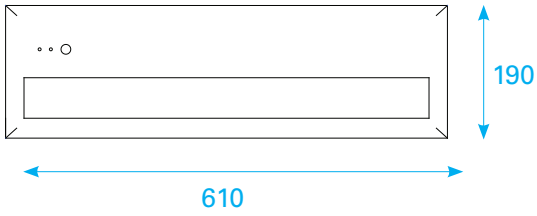

Figure 1. Front panel - from in front.

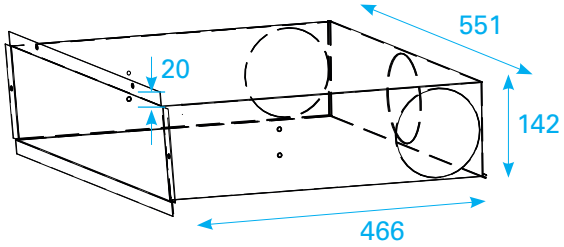

Figure 2. Diffuser box - from diagonally above. Three different possibilities are marked for connection of ducts.

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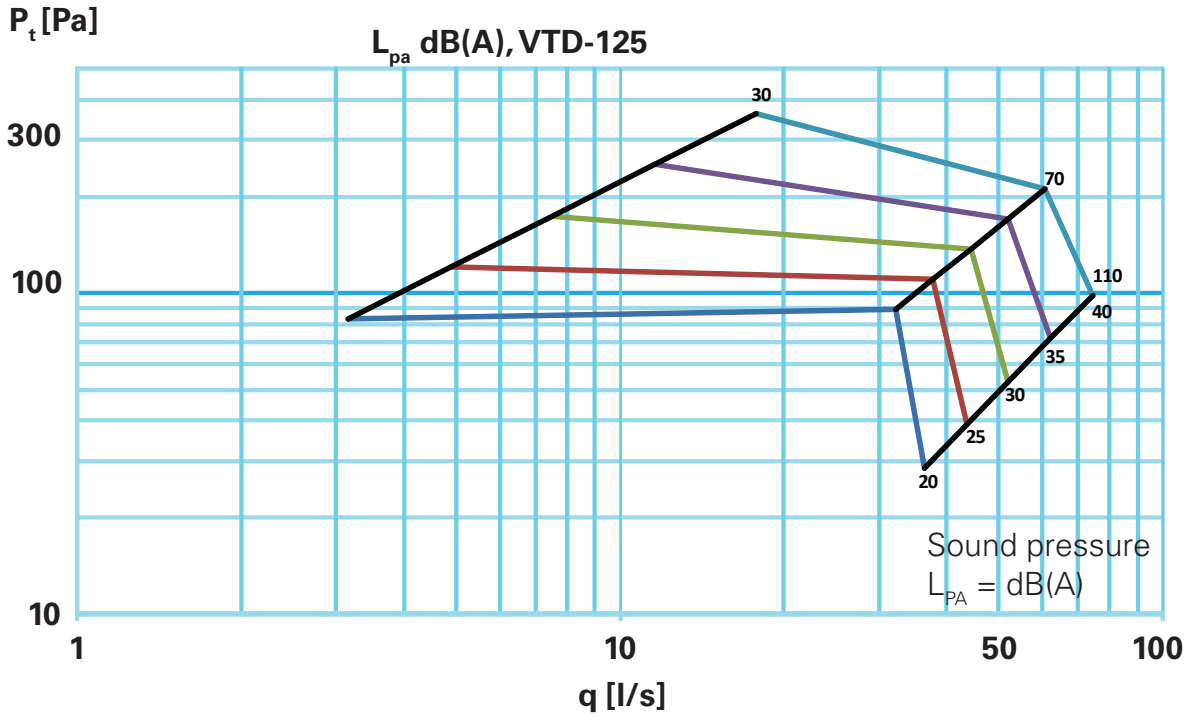
Pressure, flow and noise levels.

The sound pressure levels L_{PA} in the diagram correspond to A-weighted sound levels in the reverberant field with 10 m² equivalent sound absorption area. This corresponds to 4 dB room damping in a normally damped room with a room volume of 25 m³. On the right are examples of corrections for other types of rooms.

Room volume	Room type	Correction
25 m³	hard room	+2 dB
25 m³	normal room	0 dB
25 m³	damped room	-2 dB
150 m³	hard room	-3 dB
150 m³	normal room	-5 dB
150 m³	damped room	-7 dB



Other corrections
Sound output level/octave band: L_w dB
Sound pressure level: L_{PA} dB(A) (read from diagram)
Corr.: K_0 dB (read from Table 1)

$L_w = L_{PA} + K_0$

The measurements have been carried out according to ISO 9614-2 and ISO 691:1995.

Table 1: Correction, K_0 [dB]

VTD	Octave band [Hz]							
	63	125	250	500	1000	2000	4000	8000
125	8	0	-2	-4	0	-3	-8	-12

Tolerance: at 63 (Hz) ± 6 dB misc. ± 3 dB.

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Accessories

Flow balancing
VTD has the possibility of controlling an extract air damper equipped with damper motor and flow sensor for balancing; see DCV-SL slave regulation. For balancing of several VTD diffusers working together, see DCV-FB.

Lighting system control
Lighting can be controlled via occupancy sensor and/or manually via push button using the separate CBR lighting control box.

Radiator control
Valve actuators can be connected for stepwise control of radiators for additional heating. There is a built-in function for cold draught protection.

Electrical radiator control
A heating coil or electrical radiator can be controlled with the CBT control unit.

Fan air cooling
Additional cooling can be connected in step-wise with the CBF fan air cooler control unit.

Carbon dioxide sensor (CO_2)
By connecting carbon dioxide sensors, you can obtain perfect air quality, the right carbon dioxide content and the right temperature. The unit is available both as wall sensor (GTQV) and duct sensor (GTQD).

Set point changeover switch
To change the temperature setpoint in a room, you can install a GTV-O, which is a wall mounted microswitch for changing temperature setpoints.

External occupancy sensor
An external occupancy sensor for alternative placing of detectors can be connected.

Remote control switch
The WTR wireless transmitter can be connected as an accessory to the VTD for control of the WRS remote control switch. The function gives the opportunity of limiting the use of electricity for peripheral equipment when there are no people present.